REMARKS

Reconsideration is respectfully requested. Claims 1-4 are present in the application. Claims 1-4 are amended.

Support for the amendments to claims 1 and 2 are found, for example, in paragraphs 0039, 0040, 0046, 0047, 0048, and FIGS. 1 and 2 of the present application (paragraph references being based on the publication of this application, US Patent Application Publication US 2006/0183807 A1). Amendments to claims 3 and 4 are based on descriptions found, for example, in paragraphs 0046, 0047, 0048, and FIGS. 1 and 2 of the application publication.

Claim 1-4 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Sawada et al (JP 2002-028471) in view of Mizuno et al (JP 2002-231980). Applicants respectfully traverse.

It is noted that the office action refers to both cited documents as JP 2002-028471, but it is understood that the meaning is that Sawada is JP 2002-028471 and the second document Mizuno et al is JP 2002-231980.

The amended claim 1 relates to a preparation process of a colloidal crystal. The colloidal crystal preparation process comprises "a step of forming a gas pulse from a compressed gas by using gas pulse formation means and outputting the formed gas pulse" and "a step of applying the gas pulse to a colloidal

crystal preparation vessel having a flat plate capillary portion, wherein a colloidal solution filled in the flat plate capillary portion is made to flow at a pressure rise phase and a constant pressure phase of the applied gas pulse, and the flow of the colloidal solution is stopped at a pressure drop phase of the applied gas pulse.

By using the gas pulse formation means, controlled gas pulse can be formed from moment to moment without requiring special technique of those skilled in the art, which is conventionally required. As a result, it is possible to provide the colloidal crystal with improved reproducibility (refer to, e.g., paragraph 0041 of US Patent Application Publication) thereby increasing yield.

Further, the colloidal solution starts flowing at the pressure rise phase of the gas pulse, and the flow becomes the strongest at the constant pressure phase, followed by stopping at the pressure drop phase (refer to, e. g., paragraph 0046 in us Patent Application Publication). Specifically, the colloidal solution is made to flow (shearing flow) in a certain direction at the pressure rise phase and constant pressure phase of the gas pulse, so that monodisperse particles in the colloidal solution are spontaneously oriented. Further, the flow of the colloidal solution is stopped at the pressure drop phase of the gas pulse, whereby the orientation of the monodisperse particles in the colloidal solution can be maintained. As a result, a

colloidal crystal having good crystallinity can be generated. The shape of the time-varying-waveform (hereinafter, referred to merely as shape) of the gas pulse (i.e. , pressure rise phase, constant pressure phase, and pressure drop phase) is controlled by the gas pulse formation means without depending on the special technique of those skilled in the art, which is conventionally required. Thus, a colloidal crystal having good single crystallinity can reliably be provided with improved reproducibility.

Regarding amended claim 2, claim 2 relates to a preparation process of a colloidal crystal gel. The colloidal crystal gel preparation process comprises "a step of forming a gas pulse from a compressed gas by using gas pulse formation means and outputting the formed gas pulse", "a step of applying the gas pulse to a colloidal crystal preparation vessel having a flat plate capillary portion, wherein a colloidal solution containing high-molecular gelation agent filled in the flat plate capillary portion is made to flow at a pressure rise phase and a constant pressure phase of the applied gas pulse, and flow of the colloidal solution is stopped at a pressure drop phase of the applied gas pulse", and "a step of gelating the high-molecular gelation agent in the colloidal crystal containing high-molecular gelation agent obtained through the gas pulse application process".

Since the gelation of the high-molecular gelation agent is achieved in the gelation process after the colloidal crystal having good single crystallinity is obtained with improved reproducibility as described in "3-1", a colloidal crystal gel having good single crystallinity can be provided with improved reproducibility.

Regarding amended claim 3, the amended claim relates to a system that prepares a colloidal crystal. The system comprises "compressed gas feeder means", "gas pulse formation means for forming a gas pulse from the compressed gas fed by the compressed gas feeder means and outputting the formed gas pulse", and "a colloidal crystal preparation vessel having a flat plate capillary portion that receives application of the gas pulse to form a colloidal crystal, wherein "the gas pulse formation means forms a gas pulse whose pressure rise phase and constant pressure phase make a colloidal solution to flow and whose pressure drop phase stops the flow of the colloidal solution and outputs the formed gas pulse".

The gas pulse formation means forms a gas pulse whose pressure rise phase and constant pressure phase make a colloidal solution to flow and whose pressure drop phase stops the flow of the colloidal solution and outputs the formed gas pulse, so that the colloidal solution is made to flow (shearing flow) in a certain direction, allowing monodisperse particles in the colloidal solution to be spontaneously oriented. Further, the

flow of the colloidal solution is stopped at the pressure drop phase of the gas pulse. As a result, a colloidal crystal having good crystallinity can be 25 generated. The shape (i.e., pressure rise phase, constant pressure phase, pressure drop phase) of the gas pulse suitable for generating the colloidal crystal from the colloidal solution is controlled by the gas pulse formation means without depending on the special technique of those skilled in the art, which is conventionally required, Thus, a colloidal crystal having good single crystallinity can reliably be provided with improved reproducibility.

Regarding amended claim 4, the amended claim 4 relates to a system that prepares a colloidal crystal gel. The system comprises "compressed gas feeder means", "gas pulse formation means for forming a gas pulse from the compressed gas fed by the con1pressed gas feeder means and outputting the formed gas pulse", and "a colloidal crystal preparation vessel having a flat plate capillary portion that receives application of the gas pulse to form a colloidal crystal containing high-molecular gelation agent, wherein "the gas pulse formation means forms a gas pulse whose pressure rise phase and constant pressure phase make a colloidal solution to flow and whose pressure drop phase stops the flow of the colloidal solution and outputs the formed gas pulse". In addition, the system includes "gelation acceleration means for gelating the high-molecular gelation agent in the colloidal crystal".

Since the gelation of the high-molecular gelation agent is achieved by the gelation acceleration means after the colloidal crystal having good single crystallinity is obtained with improved reproducibility as described 2 paragraphs above, a colloidal crystal gel having good single crystallinity can be provided with improved reproducibility.

Addressing the reasoning of the rejection, the Examiner has expressed the position that this invention has no inventive step in the light combination of the reference Sawada et al. (JP 2002-028471) and reference Mizuno et a1. (JP2002-231980). However, this determination of the Examiner is, respectfully, incorrect. Why the determination of the Examiner is incorrect will be described below with the detailed description of contents of the references.

Regarding Reference Sawada

Reference Sawada relates to a process for preparing colloidal crystals and colloidal crystal gels, which is cited in the Prior art section of this specification. Further, as pointed by the Examiner, the reference Sawada discloses that a pulse-like pressure is applied to a monodisperse particle solution (refer to paragraphs 0022 and 0028) of reference Sawada.

However, reference Sawada does not disclose nor suggest "a step of forming a gas pulse from a compressed gas by using gas pulse formation means and outputting the formed gas pulse" and

"a step of applying the gas pulse whose pressure rise phase and constant pressure phase make a colloidal solution to flow and whose pressure drop phase stops the flow of the colloidal solution to a colloidal crystal preparation vessel having a flat plate capillary portion" as described in claims 1 and 2, and "gas pulse formation means for forming a gas pulse whose pressure rise phase and constant pressure phase make a colloidal solution to flow and whose pressure drop phase stops the flow of the colloidal solution and outputting the formed gas pulse" as described in claims 3 and 4.

The reference Sawada merely discloses that a pulse-like pressure is applied to the monodisperse particle solution but does not mention means for applying the pulse-like pressure and the pulse shape of the pulse-like pressure. Further, reference Sawada does not describe a relationship between the pulse shape of the applied pressure and shearing flow of the colloidal solution at all. Further, reference Sawada does not see the low reproducibility due to manual operation (i.e., "to stably prepare a colloidal crystal/colloidal crystal gel with improved reproducibility without requiring special technique of those skilled in the art" which an object of the invention) as a problem.

Therefore, adoption of the shape of the gas pulse having the pressure rise phase and constant pressure phase that give to the colloidal crystal shearing flow and pressure drop phase for

maintaining the orientation of the colloidal crystal and gas pulse formation means for forming such a gas pulse which are described in claims 1 to 4 cannot be derived from reference Sawada.

From the above, it may be seen that the invention specified by the amended claims 1 to 4 differs from the technique disclosed in reference Sawada and thus has novelty and inventive step over reference Sawada.

Addition of Mizuno does not overcome this lack of teaching or suggestion in Sawada.

Regarding Mizuno

As recognized by the Examiner, the reference Mizuno relates to a thin-film semiconductor processing apparatus that delaminates an epitaxial thin-film from a semiconductor substrate and discloses that a compression gas is fed to a chamber to thereby delaminate the epitaxial thin-film from the semiconductor substrate. More in detail, according to reference Mizuno, the fed compressed gas penetrates through a porous Si layer to allow pressure to be applied to the semiconductor substrate and epitaxial thin-film from the porous Si layer (refer to, e.g., paragraph 0016 of reference Mizuno). As a result, the epitaxial thin-film is pushed up together with a piston provided in the apparatus to be delaminated from the semiconductor substrate.

As described above, the reference Mizuno relates to the thin-film semiconductor processing apparatus and is different from the colloidal crystal or colloidal crystal gel in the technical field. Naturally, reference Mizuno merely discloses that a feeder means is used to feed the compressed gas to the chamber but does not disclose nor suggest "a step of applying the gas pulse whose pressure rise phase and constant pressure phase make a colloidal solution to flow and whose pressure drop phase stops the flow of the colloidal solution to a colloidal crystal preparation vessel having a flat plate capillary portion" as described in claims land 2, "a step of gelating of the high-molecular gelation agent in the colloidal solution" as described in claim 2, "gas pulse formation means for forming a gas pulse whose pressure rise phase and constant pressure phase make a colloidal solution to flow and whose pressure drop phase stops the flow of the colloidal solution and outputting the formed gas pulse" as described in claims 3 and 4, and "gelation acceleration means for gelating the h1gh-molecular gelation agent in the colloidal crystal" as described in claim 4.

More in detail, although reference Mizuno discloses that the feeder means is used to feed the compressed gas, it does not mention at all the shape of the compressed gas and a relationship between the shape of the compressed gas and delamination of the epitaxial thin-film. Further, since the invention disclosed in reference Mizuno is different from the

colloidal crystal or colloidal crystal gel in the technical field, it does not disclose at all a relationship between the fed compressed gas and shearing flow of the colloidal solution. That is, it is practically impossible for reference Mizuno to focus on the shape of the compressed gas suitable to delaminate the epitaxial thin-film and disclose the control of the shape of the compressed gas to a predetermined shape, a gas compressor that performs such control and, further, the control of the shape of the compressed air to a shape suitable for preparing the colloidal crystal/colloidal crystal gel, and a gas compressor that performs such control.

Therefore, a use of the gas pulse formation means in the preparation of the colloidal crystal and colloidal crystal gel, and adoption of the shape of the gas pulse having the pressure rise phase and constant pressure phase that give to the colloidal crystal shearing flow and pressure drop phase for maintaining the orientation of the colloidal crystal and gelation of the colloidal crystal which are described in claims 1 to 4 cannot be derived from reference Mizuno.

From the above, the invention specified by the amended claims 1 to 4 differs from the technique disclosed in reference Mizuno and thus has novelty and inventive step over the reference Mizuno.

Combination of Sawada and Mizuno

The Examiner has concluded that the invention has no inventive step over the combination of references Sawada and Mizuno. Reference Sawada, which is cited in the Prior art section of the present application's specification, relates to a technical field of a colloidal crystal and a colloidal crystal gel. On the other hand, reference Mizuno relates to a thin-film semiconductor processing apparatus which is different from the colloidal crystal and colloidal crystal gel in the technical field. Thus, reference Mizuno does not disclose nor suggest that the compressed gas to be fed to the thin-film semiconductor processing apparatus is utilized in preparation of the colloidal crystal and colloidal crystal gel.

Reference Sawada intends to prepare the colloidal crystal and colloidal crystal gel while reference Mizuno intends to achieve delamination of the epitaxial thin-film from the semiconductor substrate, and there is no commonality in the object between them. Further, the references Sawada and Mizuno do not address the issue of "to stably prepare a colloidal crystal/colloidal crystal gel with improved reproducibility without requiring special technique of those skilled in the art" which is an object of the present invention.

Thus, there is no motivation of combining the two references which are different from each other in the technical field and object. From the above, we consider that it is

difficult to associate references Sawada and Mizuno and thus the combination of references Sawada and Mizuno is not appropriate.

Even if references Sawada and Mizuno are combined, the invention cannot be derived from the combination.

More in detail, it is not obvious that inventions as described in claims 1 to 4 can be obtained by applying reference Mizuno that does not disclose nor sU9gest the control of the compressed gas so as to allow the shape of the compressed gas to have the pressure rise phase, constant pressure phase, and pressure drop phase and a gas compressor that performs such control to reference Sawada.

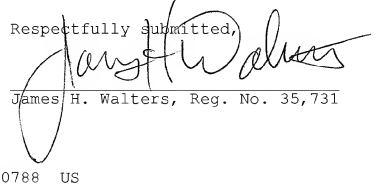
Further, as described above, references Sawada and Mizuno do not disclose nor suggest "a step of applying the gas pulses whose pressure rise phase and constant pressure phase make a colloidal solution to flow and whose pressure drop phase stops the flow of the colloidal solution to a colloidal crystal preparation vessel having a flat plate capillary portion" as described in claims 1 and 2 and "gas pulse formation means for forming a gas pulse whose pressure rise phase and constant pressure phase make a colloidal solution to flow and whose pressure drop phase stops the flow of the colloidal solution and outputting the formed gas pulse" as described in claims 3 and 4. Thus, even the references Sawada and Mizuno are simply combined, the inventions as described in claims 1 to 4 cannot be derived.

From the above, amended claims 1 to 4 have inventive step over references Sawada and Mizuno, whether considered alone, or when combined.

In light of the above noted remarks, this application is believed in condition for allowance and notice thereof is respectfully solicited. The Examiner is asked to contact applicants' attorney at 503-224-0115 if there are any questions.

It is believed that no further fees are due with this filing in that the required fees are being submitted herewith. However, if additional fees are required to keep the application pending, please charge deposit account 503036. If fee refund is owed, please refund to deposit account 503036.

Respectfully submitted,



James H. Walters, Reg. No. 35,731

Customer number 802
patenttm.us
P.O. Box 82788
Portland, Oregon 97282-0788 US
(503) 224-0115
DOCKET: T-1466

Certification of Electronic Transmission

I hereby certify that this correspondence is being electronically transmitted to the Patent and Trademark Office via the EFS system on this March 1, 2010.